

CLAIMS

1. A permanent magnet brushless motor comprising:
  - a wound assembly comprising permeable laminations with slots;
  - an insulated copper wire wound within the slots to provide electrical phases;
  - a field assembly comprising a permeable structure and at least 20 magnet poles arranged thereon;
  - wherein the wound assembly and the field assembly are arranged to produce a motive force when the electrical phases of the wound assembly are excited; and
  - wherein the wound assembly has more slots than the field assembly has poles.
2. The permanent magnet brushless motor of claim 1 wherein the motor has 36 slots and 46 poles.
3. The permanent magnet brushless motor of claim 1 wherein the motor has 30 slots and 38 poles.
4. The permanent magnet brushless motor of claim 1 wherein the wound assembly rotates and the field assembly remains still.
5. A permanent magnet brushless motor comprising:
  - a wound assembly with slots formed therein;
  - an insulated copper wire wound within the slots to provide electrical phases;
  - a field assembly comprising a permeable structure and permanent magnet poles arranged thereon;
  - wherein the wound assembly and the field assembly are arranged to produce a motive force when the electrical phases of the wound assembly are excited; and
  - wherein the ratio of slots to poles is less than 0.75.

6. A permanent magnet brushless motor comprising:
  - a wound assembly with slots formed therein;
  - an insulated copper wire wound within the slots to provide electrical phases;
  - a field assembly comprising a permeable structure and permanent magnet poles arranged thereon;
  - wherein the wound assembly and the field assembly are arranged to produce a motive force when the electrical phases of the wound assembly are excited; and
  - wherein the ratio of slots to poles is greater than 0.75 but less than 1.0.
7. A permanent magnet brushless motor according to claim 6 wherein the ratio of slots to poles is less than 0.90.
8. A slow speed/high torque permanent magnet brushless servo motor comprising:
  - a wound assembly with slots formed therein;
  - an insulated copper wire wound within the slots to provide electrical phases.
  - a field assembly comprising a permeable structure and at least 20 permanent magnet poles arranged thereon;
  - wherein the wound assembly and the field assembly are arranged to produce a motive force when the electrical phases of the wound assembly are excited; and
  - wherein the ratio of slots to poles is greater than 0.5 but less than 1.0.
9. The motor according to claim 8 wherein the slot pole ratio is chosen to create a balanced winding.
10. The motor according to claim 8 wherein the slot pole ratio is chosen for optimum cogging performance.

11. The motor according to claim 8 wherein the slot/pole ratio is chosen to enable efficient machine winding of the wound assembly.
12. The motor according to claim 8 wherein the slot/pole ratio is chosen to have a low total harmonic distortion.
13. The motor according to claim 8 wherein the slot pole ratio is chosen to create a balanced winding, with optimum cogging performance, and efficient machine winding of the wound assembly.